

CLAIMS

We claim:

1. A method of manufacturing a powder having improved hydration characteristics, the method comprising the steps of:

- (a) hydrating guar gum splits;
- (b) processing the hydrated splits, said processing step including the substeps, in either order, of flaking the splits and extruding the splits;
- (c) grinding said processed splits into a powder; and
- (d) drying the powder.

2. The method of claim 1, in which the guar gum splits comprise polygalactomannan.

3. The method of claim 1, in which the guar gum splits have been chemically modified.

4. The method of claim 1, in which the guar gum splits have been genetically modified.

5. The method of claim 1, further including the step of screening the powder after drying.

6. The method of claim 1, in which:  
the splits are hydrated in step (a) to about a 20% - 80% moisture content at about 80 - 200 degrees F;  
the hydrated splits are extruded in step (b) through a 2" - 8" diameter barrel; and  
the powder is dried in step (d) to a 1% - 10% moisture content.

7. The method of claim 6, in which said dried powder is then screened through a 100 mesh sieve.

8. The method of claim 1, in which the splits are hydrated in step (a) to about a 20% - 80% moisture content at about 80 - 200 degrees F.

9. The method of claim 1, in which the hydrated splits are extruded in step (b) through a 2" - 8" diameter barrel.

10. The method of claim 1, in which the powder is dried in step (d) to a 1% - 10% moisture content.

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11. The method of claim 2, in which the powder is screened in said screening step through a 100 mesh sieve.

12. A guar gum powder product of the process comprising the steps of:

- (a) hydrating guar gum splits;
- (b) processing the hydrated splits, said processing step including the substeps, in either order, of flaking the splits and extruding the splits;
- (c) grinding said processed splits into a powder; and
- (d) drying the powder.

13. The guar gum powder product of claim 12, in which the guar gum splits comprise polygalactomannan.

14. The guar gum powder product of claim 12, in which the guar gum splits have been chemically modified.

15. The guar gum powder product of claim 12, in which the guar gum splits have been genetically modified.

16. The guar gum powder product of claim 12, in which said powder product hydrates faster than a corresponding powder made without said extruding substep in step (b).

17. The guar gum powder product of claim 12, in which said powder product has a hydration acceleration rate that is faster than a corresponding powder made without said extruding substep in step (b).

18. The guar gum powder product of claim 12, in which said powder product has a hydration acceleration rate that is slowed down less by lower temperature than a corresponding powder made without said extruding substep in step (b).

19. The guar gum powder product of claim 12, in which said powder product achieves about 90% hydration after about 5 minutes at about 70 degrees F.

20. The guar gum powder product of claim 12, in which said powder product achieves about 90% hydration after about 5 minutes at about 40 degrees F.

21. The guar gum powder product of claim 12, in which said powder product achieves about 50% hydration after about 60 seconds at about 70 degrees F.

22. The guar gum powder product of claim 12, in which said powder product achieves about 50% hydration after about 90 seconds at about 40 degrees F.

23. The guar gum powder product of claim 12, in which said powder product achieves about 90% hydration after about 5 minutes at about 70 degrees F and after about 5 minutes at about 40 degrees F, and in which said powder product further achieves about 50% hydration after about 60 seconds at about 70 degrees F and after about 90 seconds at about 40 degrees F.

24. The guar gum powder product of claim 12, in which:  
the splits are hydrated in step (a) to about a 20% - 80% moisture content at about 80 - 200 degrees F;

the hydrated splits are extruded in step (b) through a 2" - 8" diameter barrel; and  
the powder is first dried in step (d) to a 1% - 10% moisture content and then screened through a 100 mesh sieve.

25. The guar gum powder product of claim 23, in which:  
the splits are hydrated in step (a) to about a 20% - 80% moisture content at about 80 - 200 degrees F;

the hydrated splits are extruded in step (b) through a 2" - 8" diameter barrel; and  
the powder is first dried in step (d) to a 1% - 10% moisture content and then screened through a 100 mesh sieve.

26. The guar gum powder product of claim 12, in which said powder product is an agent in a host product selected from the group consisting of:

- (a) drilling fluid;
- (b) fracturing fluid;
- (c) animal litter;
- (d) explosive;
- (e) foodstuff;
- (f) paperstock;
- (g) floor covering;
- (h) synthetic fuel briquettes;
- (i) water thickener for firefighting;
- (j) shampoo;
- (k) personal care lotion;
- (l) household cleaner;
- (m) catalytic converter catalyst;
- (n) electroplating solution;
- (o) diapers;
- (p) sanitary towels;
- (q) super-adsorbent in food packaging;
- (r) sticking plasters for skin abrasions;
- (s) water-adsorbing bandages;
- (t) foliar spray for plants;
- (u) suspension for spraying plant seeds;
- (v) suspension for spraying plant nutrients;
- (w) flotation aid; and
- (x) flocculent.

27. A method of manufacturing a thickening agent for fluids, the method comprising the steps of:

- (a) hydrating plant seed endosperms that contain a polymer having fluid thickening properties;
- (b) processing the hydrated endosperms, said processing step including the substeps, in either order, of flaking the endosperms and extruding the endosperms;
- (c) grinding said processed endosperms into a powder; and
- (d) drying the powder.

28. The method of claim 27, in which the plant seed endosperms are taken from guar plants.

29. The method of claim 27, in which said polymer is a polysaccharide.

30. The method of claim 27, in which said polymer is polygalactomannan.

31. The method of claim 27, in which the plant seed endosperms have been chemically modified.

32. The method of claim 27, in which the plant seed endosperms have been genetically modified.

33. The method of claim 27, in which said powder is an agent in a host product selected from the group consisting of:

- (a) drilling fluid;
- (b) fracturing fluid;
- (c) animal litter;
- (d) explosive;
- (e) foodstuff;
- (f) paperstock;

- (g) floor covering;
- (h) synthetic fuel briquettes;
- (i) water thickener for firefighting;
- (j) shampoo;
- (k) personal care lotion;
- (l) household cleaner;
- (m) catalytic converter catalyst;
- (n) electroplating solution;
- (o) diapers;
- (p) sanitary towels;
- (q) super-adsorbent in food packaging;
- (r) sticking plasters for skin abrasions;
- (s) water-adsorbing bandages;
- (t) foliar spray for plants;
- (u) suspension for spraying plant seeds;
- (v) suspension for spraying plant nutrients;
- (w) flotation aid; and
- (x) flocculent.

34. An improved method for manufacturing a fluid thickener in powder form wherein plant seed endosperms are hydrated, flaked, ground and dried, the endosperms containing a polymer having fluid thickening characteristics, the improvement comprising:

5 extruding the endosperms after hydrating but before grinding, said extruding performed either before or after the endosperms are flaked.

35. The improvement of claim 34, in which the plant seed endosperms are taken from guar plants.

36. The improvement of claim 34, in which said polymer is a polysaccharide.

37. The improvement of claim 34, in which said polymer is polygalactomannan.

• 38. The improvement of claim 34, in which the plant seed endosperms have been chemically modified.

39. The improvement of claim 34, in which the plant seed endosperms have been genetically modified.

40. The improvement of claim 34, in which said fluid thickener in powder form is an agent in a host product selected from the group consisting of:

- (a) drilling fluid;
- (b) fracturing fluid;
- 5 (c) animal litter;
- (d) explosive;
- (e) foodstuff;
- (f) paperstock;
- (g) floor covering;
- 10 (h) synthetic fuel briquettes;



- (i) water thickener for firefighting;
- (j) shampoo;
- (k) personal care lotion;
- (l) household cleaner;
- 5 (m) catalytic converter catalyst;
- (n) electroplating solution;
- (o) diapers;
- (p) sanitary towels;
- (q) super-adsorbent in food packaging;
- 10 (r) sticking plasters for skin abrasions;
- (s) water-adsorbing bandages;
- (t) foliar spray for plants;
- (u) suspension for spraying plant seeds;
- (v) suspension for spraying plant nutrients;
- 15 (w) flotation aid; and
- (x) flocculent.

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